THE MINERAL INDUSTRY OF INDIA

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India was one of Asia's best-performing economies. In 2004, India's gross domestic product (GDP) grew by 6.5%. The poor monsoon rains in July, however, led to an average crop yield, which was unable to boost incomes in the countryside. Agriculture accounted for 22% of the GDP and sustained nearly 60% of the total population. Industrial production staged a turnaround and the services sector was going strong; together, these sectors accounted for 75% of the GDP. Inflation rose sharply in response to rising global oil prices. Exploration and mine development were open to private sector and foreign company investment (Far Eastern Economic Review, 2004).

India has significant mineral resources and produced several metals, many industrial minerals, and a few mineral fuels (table 1). The mineral industry was characterized by a large number of small-scale operations. Large state-owned companies operated most of the coal and metal mines. The country was ranked first in world output of mica and third in the production of barite, chromite, coal, kyanite and sillimanite, and talc and pyrophyllite.

Government Policies and Programs

As the process of privatizing the mining sector moved forward, the Government encouraged greater private sector participation in the exploration for and exploitation of minerals. The policy changes attracted many multinational companies to invest in exploration for base metals and other minerals. As of December, 73 proposals involving foreign direct investment worth $900 million and reconnaissance permits involving an area of 238,000 square kilometers (km^2) were approved. The Government abolished foreign investment limits on private oil exploration and marketing companies. A planned privatization of India's large oil companies was shelved by the Government.

Commodity Review

Metals

Aluminum.—Utkal Alumina International Ltd.'s $1 billion alumina project was delayed following local protests. The State government of Orissa allotted 3,000 hectares of land to the company and seemed reluctant to rush the relocation of about 140 families from the site. The project was 5 years behind its original schedule. The company was 55% owned by Hindalco Industries Ltd., and Alcan Aluminium Ltd. of Canada held the remainder. The alumina refinery would initially produce 1.5 million metric tons per year (Mt/yr) of alumina (Metal-Pages, 2004c§[1]).

Sterlite Industries Ltd. planned to invest $2 billion during the next 3 years to expand current operations. The expansion plan included an alumina refinery project in Orissa, Bharat Aluminium Co. Ltd., and Hindustan Zinc Ltd. National Aluminium Co. Ltd. invited applications from contractors and suppliers for the expansion of its alumina refinery and smelter in Orissa. The company planned to increase production capacity for bauxite to 6.3 Mt/yr from 4.8 Mt/yr; alumina, to 2.1 Mt/yr from 1.58 Mt/yr; and aluminum, to 460,000 metric tons per year (t/yr) from 345,000 t/yr (Mining Journal, 2004b).

Vedanta Resources plc started construction of a new $1.9 billion alumina refinery in Orissa to produce 1.4 Mt/yr of alumina in 2007. Some of the plant's output would be used by Bharat Aluminium, and the remainder was to be sold in the Indian market. Vedanta also was considering the possibility of building an aluminum smelter in Orissa. Having received the mining lease from the State government, the company was awaiting environmental approvals for bauxite mining from the Federal Government (Mining Journal, 2004c).

Copper.—The wholly owned subsidiary of Pebble Creek Resources Ltd. of Canada in India, Adi Gold Mining Private Ltd., owned 100% interest in a prospecting license of 7.9 km^2 that covered the Askot deposit near Almora in Uttaranchal. The deposit was a high-grade massive sulfide mineralization of copper, gold, lead, silver, and zinc. The company's 60-km^2 Gadarwara property in the Narsinghpur District in Madhya Pradesh showed geophysical anomalies that might indicate a copper and gold deposit of the Olympic Dam type or a nickel and platinum-group metals deposit of the Norilsk type (Pebble Creek Resources Ltd., 2004).

Indian copper smelters faced a difficult time owing to tight supplies of copper concentrate imported from Australia and South America. Shortages forced the copper producers to cut inventories and pay higher prices for copper concentrate. India imported 1.35 Mt/yr of copper concentrate and produced about 100,000 t/yr of its own, which was used to make 400,000 t/yr of copper cathode. Copper production was expected to increase by 100,000 t/yr as a result of capacity expansions of Hindalco Industries and Sterlite Industries (Reuters, 2004a).

Sterlite Industries received 22% of its copper concentrate requirements from Australia. The company operated a 180,000-t/yr smelter at Tuticorin in southern India, a 180,000-t/yr refinery at Silvassa in western India, and two copper-rod plants with a combined capacity of 140,000 t/yr.

Hindustan Copper Co. Ltd. (HCL) reopened its Ghatsila copper smelter in June as rising global copper prices boosted the metal's prospects. The 16,500-t/yr smelter in Jharkland had been shut down for care and maintenance in July 2003. The company planned to

[1]References that include a section mark (§) are found in the Internet References Cited section.

shut down its 45,000-t/yr-capacity Khetri copper smelter in Rajasthan for annual maintenance. HCL was 98.95% owned by the Government (Reuters, 2004b).

SWIL Limited was to gradually increase production at its new plant in Gujarat after a 6-year delay. The plant operated at about 60% of its installed capacity in July. When the plant reaches its full capacity of 70,000 t/yr, SWIL will become India's third ranked copper producer (Metal Bulletin, 2004e).

Gold.—Deccan Gold Mines discovered another gold-bearing deposit in the Haveri zone after its successful find at the Dharwar Shimoga belt. The 470-by-27 meter (m) zone at Ganajur could potentially yield 2 metric tons (t) of gold. The discovery was the outcome of reconnaissance drilling in the Dharwar and Haveri Districts. Within the 5,000-km^2 Dharwar Shimoga Block, Deccan Gold identified 22 targets and completed drilling in 4 of them. Drilling was also completed at Uti, which is located in the Hutti belt in Raichur (Hindu Business Line, 2004§).

India's gold production came mainly from the copper smelters as a byproduct. Birla Copper and Sterlite Industries produced more gold than the only producing gold mine at Hutti in Karnataka. Hutti Gold Mines Co. was owned by the Government of Karnataka and planned to raise output to 3.5 t/yr from 3 t/yr in 2004. The company also planned to tap the Hutti South Block at the Hirabudini Mine and to adopt bioleaching technology (Mining Journal, 2004a).

Iron and Steel.—Better management, plant modernization, and staff cuts made India one of the world's cheapest steel producers. The steel industry was on the upswing owing to strong growth in demand. India was the leading producer of sponge iron and the eighth ranked steel producer in the world. The Ministry of Steel is responsible for the planning and development of the iron and steel industry, the development of essential raw materials, and related functions.

BHP Billiton of Australia and Pohang Iron & Steel Co. Ltd. of the Republic of Korea launched a joint venture to develop iron ore deposits in eastern India. The companies planned to develop an iron ore mine, a 10-Mt/yr steel plant, and a port in Orissa (Metal-Pages, 2004h§).

Steel Authority of India Ltd. (Sail) signed a memorandum of understanding with Kudremukh Iron Ore Co. Ltd. (KIOCL) to form a 50/50 joint-venture company to develop iron ore mines at Barsua, Kalta, and Taldih in Orissa and start a pellet plant. Sail was India's leading producer of iron ore with a capacity of 20 Mt/yr, and KIOCL operated and maintained the single largest iron ore mine in India. Mecon Ltd. was engaged to prepare the feasibility study for the project, and National Mineral Development Corp. Ltd. (NMDC) would undertake the ore channelization study (Steel Authority of India Ltd., 2004§).

The Government raised the 3-Mt/yr ceiling on exports of high-grade iron ore of 65% to 66% iron from the Bellary-Hospet region to 5 Mt/yr in 2004. Ores with less than 64% iron content could be exported in any quantity without any restrictions and were free from canalization (Metal Bulletin, 2004a).

In 2004, Indian steel mills were to lose all their supplies of coke and coking coal from China owing to the restriction of its supplies for domestic consumption. India imported 3 Mt/yr of low ash coke and 15 Mt/yr of coking coal from Australia, China, Indonesia, and South Africa. India planned to seek alternative supplies and to develop its limited cokable coal reserves (Steel Times International, 2004b).

Tata Iron and Steel Co. Ltd. (Tisco) raised its ore beneficiation capacity to 400,000 t/yr from 108,000 t/yr and planned to further increase its capacity to 700,000 t/yr with an additional investment of $83 million. The initial expansion was achieved through a number of measures, which included capital investment, enhanced plant availability, and three-shift operation. The expansion project was due for commissioning by yearend 2004 (Steel Times International, 2004d).

Tisco lost 300,000 t of pig iron production in more than 3 months when its 1.2-Mt/yr blast furnace was replaced by a 1.8-Mt/yr furnace. The process, which cost $459 million, was part of its expansion program to raise plant capacity to 5 Mt/yr from 4 Mt/yr. The new furnace would be fully functional by September 2005. There was no loss in steel production (Metal Bulletin, 2004d).

NMDC decided to build a 300,000-t/yr pig iron plant based on the Russian Romelt technology. It was to be located 16 kilometers (km) from Jagdalpur at Nagarnar in the Baster District of Chhattisgarh and would process tailings from the Bailadila region. Other facilities included an oxygen plant, a waste-heat power generation plant, a lime plant, and a raw materials handling facility. The first phase of the project would cost $65.4 million and produce 300,000 t/yr of pig iron in 2005. If the plant proved successful, two more plants with capacities of 600,000 t/yr each might be added to produce a total of 1.5 Mt/yr. Romelt-Sail (India) Ltd. was formed as a joint venture between Sail and three Russian companies (Steel Times International, 2004a).

Sail planned to spend $183 million to $229 million per year during the next 8 years to increase crude steel capacity at its Bhilai works to 7 Mt/yr from 4.93 Mt/yr. It would increase the capacity of the meltshop to 3 Mt/yr from 1.5 Mt/yr. The capacity of its 1-Mt/yr plate mill would be increased. Sail also planned to build a bar and rod mill, install a new slab caster with a capacity of 800,000 t/yr, and add secondary refining units (Metal Bulletin, 2004c).

Tisco planned to increase production capacity to 15.8 Mt/yr from 4 Mt/yr by 2010. The production capacity of its Jamshedpur plant would be expanded to 7.4 Mt/yr from 4 Mt/yr in 2008. The company planned to build a steel plant in Orissa with a capacity of 6 Mt/yr and had acquired National Steel Co. Ltd. with an additional capacity of 2.4 Mt/yr. Tisco and Larsen & Toubro formed a 50/50 partnership to set up a port at Dhamra that would have the capacity to handle 13 Mt/yr of steel. The first phase investment would be $280 million. Tisco also forged a partnership with West Bengal Industrial Development Corp. to set up a 6-Mt/yr coke plant at Haldia with an investment of $70 million (Steel Times International, 2004c).

The first phase of Jindal Stainless Steel Co. Ltd.'s ferrochrome project in Orissa involved construction and installation of furnaces for the production of 150,000 t/yr of ferrochrome. The second phase would include setting up manganese-base facilities to produce 40,000 t/yr of ferromanganese and 60,000 t/yr of silicomanganese. The project was expected to be completed by May 2006 (Metal-Pages, 2004a§).

Indian Metals and Ferro Alloys Group (IMFA) started Phase 1 of a 140,000-t/yr expansion of its ferrochrome plant at Choudar in Orissa by adding a 24-megavoltoampere (MVA) furnace. Utkal Manufacturing Services Ltd. and Indian Charge Chrome Ltd. (ICCL)

were responsible for the construction. IMFA and ICCL had a combined capacity of 170,000 t/yr. After the completion of the expansion in June 2005, the combined ferrochrome capacity would be 310,000 t/yr (Metal-Pages, 2004b§).

Tisco was expected to double the capacity of its Bamnipal ferrochrome plant to 110,000 t/yr from 55,000 t/yr. The plant had a 30-MVA furnace and another one on order. The company also intended to build a 60-megawatt (MW) powerplant at Bamnipal. The $66.8 million expansion project was scheduled for completion in 2007 (Metal-Pages, 2004f§).

Jindal Stainless Steel Co. Ltd. started construction of a greenfield 1.6-Mt/yr stainless steel plant at Jajpur in Orissa. The company operated a 600,000-t/yr plant at Hisar in Haryana. The plan was to commission 800,000 t/yr of capacity by March 2007 and another 800,000 t/yr by March 2009. Jindal Stainless Steel chose Orissa for the plant site because the State has sizable deposits of chrome ore, iron ore, limestone and dolomite, manganese ore, and thermal coal (Metal-Pages, 2004d§).

Manganese.—Manganese Ore India Ltd. (MOIL) was the leading producer of high-grade manganese ore in India and operated 10 major mines in the States of Madhya Pradesh and Maharashtra. MOIL also operated a 10,000-t/yr ferromanganese plant at Balaghat Mine in Madhya Pradesh and a 1,000-t/yr electrolytic manganese dioxide plant at Dongri Buzurg Mine in Maharashtra (Metal-Pages, 2004e§).

MOIL increased output by 5% in 2004 to ease the growing domestic shortage of ore and would not export any ore. MOIL produced about 850,000 t of all grades of ore in 2003; the company sold more than 600,000 t of ferro-grade material to domestic iron producers, and the remainder was sold to the domestic steel industry. Maharashtra Elektrosmelt Ltd. ordered 151,000 t; Nava Bharat, 91,000 t; and Tisco, 16,000 t. Two other manganese producers also increased output—Tisco manganese mines doubled production to 280,000 t/yr, and Sandur Manganese & Iron Ore Ltd. increased production by 50,000 t/yr to 300,000 t/yr (Metal Bulletin, 2004b).

Sandur signed a memorandum of understanding to sell its shuttered ferroalloys plant to Jindal Iron & Steel Co. (Jisco) for $11.4 million. Formalities were expected to take about 3 months to complete and for the unit to restart. Sandur offered to run the unit for Jisco and supply manganese ore for the furnace (Metal Bulletin, 2004f).

Zinc.—Hindustan Zinc Ltd. (HZL), which was 65% owned by Sterlite Industries, operated the Rajpura Dariba, Rampura Aguela, and Zawar lead/zinc mining complexes, the Chanderiya lead/zinc smelter, and the Debari zinc smelter, which are all located in Rajasthan; and the Vizag zinc smelter, which is located in Andhra Pradesh. The combined capacity of the smelters was 232,000 t/yr of zinc ingot and 35,000 t/yr of lead.

Golden Patriot Mining Inc. (GPM) of Canada signed an agreement with Binani Industries Ltd. and RBG Minerals Industries Ltd. to develop the Ambaji copper-zinc-lead deposit in Gujarat and Rajasthan. A bankable feasibility study for the project was completed by Steffen Robertson and Kirsten Inc. of the United States in 2003. After RBG recovered its investment of $229 million and repaid all debts incurred, the project's ownership would be GPM, 32.5%; Binani, 32.5%; Gujarat Minerals Development Corp., 25%; and Rajasthan State Mines & Minerals Ltd., 10%. Binani would purchase all the zinc concentrates. RBG would be free to market copper and lead concentrates and associated byproducts (Golden Patriot Mining Inc., 2004).

Industrial Minerals

Caustic Soda.—Travancore Cochin Chemicals Ltd., which was a State-owned caustic soda producer located at Eloor, planned to phase out its old mercury plant and expand the capacity of its existing membrane plant to 150 metric tons per day (t/d) from 125 t/d. The company was replacing mercury cells with membrane cell technology and expected energy conservation, clean processing, and manpower reduction. The company was provided power at concession rates by the Kerala State Electricity Board. Of the 41 plants that manufactured caustic soda in India, 67% made use of the membrane cell technology and 31% used the mercury cell process (Metal-Pages, 2004g§).

Cement.—Gujarat Ambuja Cement Ltd. was planning to add capacity through either fresh acquisition or brownfield expansion. Its sister company Ambuja Cement Eastern Ltd. was going for a 50% capacity expansion. Cement demand was expected to grow at the rate of 7% to 8% in 2004 (Building Bulletin, 2004).

Lafarge SA of France would start commercial production at its proposed 1-Mt/yr cement plant at Mejia in Bankura in West Bengal in 2006. The construction work for the plant would begin in 2005. The project cost was estimated to be about $24 million. Lafarge India contributed 2% to the total turnover of Lafarge SA and had capacities of 5 Mt/yr of cement and 3 Mt/yr of clinker. Its cement plants are located at Arasmeta and Sonadih in Chhatisgarh and at Jojobera in Jharkland (UNI India, 2004§).

Diamond.—Several diamond-mining companies were exploring for diamond in Chhattisgarh in central India. In a joint venture with Diamond Prospecting Pvt Ltd., De Beers Consolidated Mines Ltd. was prospecting a 3,975-km^2 area in the Dhamtari, Durg, Kanker, and Rajnandgaon Districts. Jindal Steel Power Ltd. was waiting for permission to explore for diamond in a 2,500-km^2 area of the Jashpur District. Admas Prospecting Pvt Ltd. was prospecting a 3,000-km^2 area in the Mahasamud and Raipur Districts. Geo Mysore Services India was granted permission to explore for diamond in a 1,220-km^2 area in the Kanker District, a 500-km^2 area in the Rajnandgaon District, and a 1,475-km^2 area in the Jashpur District. Meera Exploration Pvt Ltd. had permission to prospect for diamond in a 481-km^2 area in the Rajnandgaon District. Emperor Granite Pvt Ltd. was exploring a 1,000-km^2 area in the Kanker District. Rio Tinto Exploration Pvt Ltd. was working on a 2,800-km^2 area in the Jashpur District, an 800-km^2 area in the Mahasamund District, and a 1,360-km^2 area in the Dhamtari, Kanker, and Raipur Districts (Antwerp Facets News Service, 2004a§).

Oropa Ltd. held an interest of 18% with an option to increase it to 27% in the Block D-7 diamond project in southeast Chhattisgarh. Several diamondiferous kimberlite diatremes were identified during the past decade. Oropa's Indian joint-venture partners attempted to have the Block D-7 prospecting license and associated permits reinstated at the first opportunity. Oropa also was awaiting the issuance of a reconnaissance permit that covered a 2,400-km^2 block adjacent to Block D-7's western boundary (ASX Co., 2004§).

In the State of Madhya Pradesh, Rio Tinto was issued four reconnaissance permits for a 10,000-km^2 area in the Chhatarpur and Panna Damoh Districts. De Beers was issued a reconnaissance permit for a survey of kimberlite pipes in the Rewa District. BHP

Minerals was issued two reconnaissance permits for diamond and other minerals in the Chhatarpur, Chhindwara, Hoshangabad, Narsinghpur, and Tikamgarh Districts. NMDC was issued a reconnaissance permit for diamond in the Panna and Satna Districts (Antwerp Facets News Service, 2004b§). The Government operated the Mahjgawan open pit mine, which is located 20 km west of Panna, with a capacity of 25,000 carats per year of good-quality diamond.

Fertilizers.—The Government decided to implement the Tariff Commission's recommendations on imported and indigenous diammonium phosphate (DAP). Group 1 DAP manufacturers were those that produced from captive phosphoric acid, and Group 2 DAP manufacturers were those that produced from imported phosphoric acid. Concessions would be determined by the production and transportation costs (standard delivered prices) that were fixed at $238 per metric ton for Group 1 and $245 per ton for Group 2. The concession rates for DAP producers that used both imported and captive phosphoric acid would be in proportion to the DAP produced from the two different sources (Fertilizer Week, 2004b).

Krishak Bharati Cooperative Ltd. issued an invitation for bids on an engineering, procurement, and construction contract for its proposed gas-based fertilizer complex, which would be located at Hazira in Gujarat. The complex would consist of a 1,850-t/d single-stream ammonia plant and a 3,200-t/d single- or two-stream urea plant. The five pre-qualified bidders were Mitsubishi Heavy Industries, Ltd.; Snamprogetti Ltd.; Tecnimont ICB Ltd.; Toyo Engineering India Ltd.; and Uhde India Limited (Asia Fertilizer Week, 2004).

Shriram operated its 379,000-t/yr urea plant at 45% of capacity in January. One of its powerplants at Kota was shut down owing to a technical problem. The shutdown reduced the company's total power-generating capacity to 90 MW from 125 MW. After repairs, Shriram would restore its production rate to 100%. The company's targeted urea production for fiscal year 2003-04 was 364,000 t (Fertilizer Week, 2004a).

Mineral Fuels

Coal.—Neyveli Lignite Corp. Ltd. planned to increase the lignite production capacity of a second mine to 15 Mt/yr from 10.5 Mt/yr and to augment the power-generation capacity of its second thermal powerplant to 1,970 MW from 1,470 MW. The power expansion involved installation of two 250-MW units. The powerplant would generate and supply electricity to the States of Karnataka, Kerala, and Tamil Nadu. After implementation, total lignite production would increase to 28.5 Mt/yr and power generation would reach 2,990 MW (Yahoo India Finance, 2004§).

India produced limited quantities of coking coal needed by its steel plants. The country was a leading importer of coking coal, mostly from Australia. The Government reduced the import duty on coal to 15% from 20%. The reduction would assist the steel producers and improve their competitiveness (Mining Journal, 2004a).

Coal India Ltd. (CIL) received expressions of interest from private parties to set up coal washeries at the pitheads. CIL would provide the parties with coal, land, and power. However, setting up physical linkage between the coal washeries and the power-generation companies remained a major problem (Coal Age, 2004).

Natural Gas.—India's natural gas reserves were not large and at the current (2004) production rate of 77 million cubic meters per day would be exhausted in 28 years. Gas finds of 410 billion cubic meters in offshore Andhra Pradesh, of from 113 billion to 142 billion cubic meters in offshore Orissa by Reliance Industries, and of reserves on the east and west coasts by Oil and Natural Gas Corp. (ONGC) will further augment gas production. Output could reach to between 195 million and 200 million cubic meters per day in 7 to 8 years (Alexander's Gas & Oil Connections, 2004c§).

Reliance Industries planned to invest $2.38 billion to develop its Dhirubhai-1 and Dhirubhai-2 Gasfields in the Bay of Bengal; the two gasfields were expected to produce 40 million cubic meters per day of gas for 7½ years beginning in August 2007. The gas would arrive at a gas-processing facility near Kakinada through a 35-km-long 24-inch-diameter pipeline. Reliance, which was an operator, held a 90% interest in the project, and Niko Resources of Canada held the remaining 10% (RigZone.com, 2004§).

Following the signing of a supply agreement with Qatar's RasGas Co. Ltd., Petronet LNG would import 5 Mt/yr of liquefied natural gas (LNG) from Qatar until December 2008. Petronet had a new $547 million 5-Mt/yr receiving terminal at Dahej on the Gujarat coast. Petronet also planned to build a 2.5 Mt/yr LNG terminal at Kochi in the southern State of Kerala and was considering doubling the Dahej terminal capacity. A cost of about $130 million would be required to bring the Dahej capacity to 10 Mt/yr in 18 to 24 months. Petronet was a consortium of Indian Oil Corp., Bharat Petroleum Corp., ONGC, and Gas Authority of India Ltd. (Oil & Gas Journal, 2004b).

Total S.A. of France signed an agreement with Shell Gas LPG to acquire a 26% stake in an LNG regasification terminal project at Hazira in Gujarat. The terminal would have an initial capacity of 2.5 Mt/yr with a planned expansion to 5 Mt/yr and would be supplied by the two partners from their various LNG sources (Petroleum Economist, 2004a).

The Government embarked on a gas hydrate resource mapping project by drilling for cores at promising locations in deep waters off the Andaman Islands, Andhra Pradesh, Goa, and Kerala. Drilling at 10 locations was planned, including 5 in the Krishna Godavari Basin. Three holes would be drilled at each location to a depth of about 500 m. One hole would be cored at each location and a total of 3,000 m of cores would be removed and analyzed. A budget of $20 million was set aside for the gas hydrate coring and resource mapping project. A gas hydrate pilot production model was prepared and the pilot plant was expected to be in production in 2006 (Alexander's Gas & Oil Connections, 2004d§).

Petroleum.—India planned to offer another round of 20 oil and gas exploration blocks as well as 6 coalbed methane (CBM) exploration blocks onshore in April. Under the first three rounds of the new exploration licensing policy, $4.3 billion of investment was committed in the 70 oil and gas blocks, and 10 CBM blocks were awarded. Exploration was undertaken in deep water areas with 34 blocks awarded. In the past two years, India reported 21 discoveries, including major gas finds in the Krishna-Godavari Basin, in Vasai, and near Surat in Rajasthan. The total discoveries amounted to more than 800 Mt of oil and oil equivalent gas. In addition, a

discovery of an estimated recoverable reserve of 170 billion cubic meters of gas was made offshore Myanmar. In the 10 CBM blocks, Great Eastern Energy reported the presence of 28.3 billion cubic meters of methane reserves in the Raniganj coalfields in West Bengal (Alexander's Gas & Oil Connections, 2004e§).

Gujarat State Petroleum Corp. made an oil discovery at its onshore 1,424-km^2 exploration block in Gujarat in July. No natural gas was reported from the find. Estimates of in-place oil could be as much as 40 million to 50 million barrels (Mbbl). The well PK-2, located 40 km from Ahmedabad at Pisawada, could initially produce 1,000 barrels per day (bbl/d), which could rise to 10,000 bbl/d. PK-2 was the sixth in the company's 7-well exploration program in the block. The company, which was the operator of the block, held a 50% stake, and Gas Authority of India Ltd. held the other 50% (Alexander's Gas & Oil Connections, 2004a§).

Cairn Energy plc of the United Kingdom reported a significant oil discovery in the Barmer District, which is located 60 km north of Saraswati in the Rajasthan basin in northwestern India. The company estimated oil in place to be 450 Mbbl to 1.1 billion barrels and reported that 50 to 200 Mbbl might be recoverable at the N-B-1 exploration well on the 5,000-km^2 block. The well intersected a stacked sequence of 12 oil-bearing reservoir units in the Fatehgarh formation. Cairn Energy held 100% interest in the block and started the first appraisal well and additional seismic surveys. A second oil discovery was made with its N-A-1 exploration well. Preliminary estimates of oil in place ranged from 130 Mbbl to 470 Mbbl; recoverable reserves were estimated to be 20 to 80 Mbbl (Oil & Gas Journal, 2004a).

Cairn Energy also completed appraisal drilling on the Mangala discovery in the same block in Rajasthan. The Mangala-5 well encountered 125 m of high-quality oil-bearing Fatehgarh sands. The Mangala-6 well at the southern end of the field encountered 69 m of oil in the Fatehgarh sands. First production was planned for late 2007 (Petroleum Economist, 2004b).

The first exploration well in ONGC's 3-year ultra-deep-water drilling campaign was spudded by Dolphin Drilling Ltd. The well was being drilled in the Gulf of Kutch off India's west coast from the deep water drillship *Belford Dolphin*. Dolphin Drilling managed and coordinated the project, and Norwell Limited provided the well's engineering design and project management. Schlumberger Limited provided the logging and well testing, M-I Overseas Limited the drilling fluid services, and GeoServices Corp. the mud logging service (Offshore Engineer, 2004).

The Government approved plans to raise the overseas investment limit in non-state-owned oil refiners to 100% from 74% in an effort to boost economic growth. It also raised the foreign investment limit in non-state-owned oil marketing companies to 100% from 74% and removed caps on investing in non-state-owned oil exploration companies, fuel pipelines, and scientific and technical journal publishers (Alexander's Gas & Oil Connections, 2004b§).

ONGC planned to spend $6.5 billion on power, petrochemicals, LNG, and refining projects during the next 3 to 4 years. It would build three gas-fired powerplants at Dahej, Ennore, and Managlore with a combined capacity of 3,546 MW. Two petrochemicals units would be set up at Managlore. A 10-Mt/yr LNG receiving terminal would be built at Managlore. The capacity of the 100,000-t/yr Tatipaka wellhead mini-refinery would be doubled, and another mini-refinery would be built at Ankleshwar (Petroleum Economist, 2004b).

Outlook

India's gold exploration will continue to be active after some finds by Deccan Gold Mines. Exploration for diamond is expected to increase in central India, and more reconnaissance permits are expected to be issued by the State government. The production of alumina and aluminum in India is expected to increase slightly in the next 2 to 3 years as a result of National Aluminium's expansion of its alumina refinery and aluminum smelter in Orissa. With the capacity expansions by Hindalco and Sterlite Industries, the reopening of HCL's smelter in Bihar, and the commissioning of SWIL's new plant in Gujarat, the output of copper is expected to increase substantially. New iron ore mines are expected to come onstream and the steel industry is expected to be on an upswing owing to strong domestic demand and capacity expansions by Sail and Tisco.

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TABLE 1

INDIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity[3]		2000	2001	2002	2003	2004
METALS						
Aluminum:						
Bauxite, gross weight	thousand metric tons	7,562 [4]	7,864 [4]	9,647 [4]	10,414 [r, 4]	11,275 [4]
Alumina, Al_2O_3 equivalent	do.	2,280	2,400	2,800	2,500	2,600
Metal, primary		643,700 [4]	624,000 [4]	671,200 [4]	798,800 [r, 4]	861,800 [4]
Cadmium metal		314 [4]	436 [4]	466 [4]	477 [4]	489 [4]
Chromium, chromite, gross weight		1,946,910 [4]	1,677,924 [4]	2,698,577 [r, 4]	2,210,000 [r, 4]	2,948,944 [4]
Cobalt metal		206 [4]	250 [4]	270 [4]	255 [4]	545 [4]
Copper:						
Mine output, Cu content		31,900 [4]	32,400 [4]	31,500 [4]	28,500 [r, 4]	28,800 [4]
Metal, primary:						
Smelter		256,000 [4]	293,000 [4]	251,400 [4]	252,000 [4]	252,000 [4]
Refinery						
Electrolytic, cathode		234,000 [4]	310,000 [4]	353,700 [4]	375,000 [4]	357,000 [4]
Fire refined		9,000	18,000	20,000	19,000	20,000
Total		243,000	328,000	374,000	394,000	377,000
Gold metal, smelter	kilograms	6,200 [4]	3,700 [4]	3,800 [4]	3,200 [r, 4]	3,800 [4]
Iron and steel:						
Iron ore and concentrate:						
Gross weight	thousand metric tons	75,950 [4]	79,200 [4]	86,400 [r, 4]	99,100 [r, 4]	126,000 [4]
Fe content	do.	48,600 [4]	50,700 [4]	55,300 [r, 4]	63,400 [r, 4]	80,600 [4]
Metal:						
Pig iron	do.	21,321 [4]	21,900 [4]	24,315 [4]	24,000	25,000
Direct-reduced iron	do.	5,440 [4]	5,590 [4]	5,731 [4]	5,800	5,800
Ferroalloys:						
Ferrochromium, including charge chrome		376,693 [4]	267,395 [r, 4]	311,927 [4]	468,677 [r, 4]	527,100 [4]
Ferrochromiumsilicon		10,000	10,000	10,000	10,000	10,000
Ferromanganese		160,000	165,000	165,000	165,000	170,000
Ferrosilicon		60,000	50,000	52,000	54,000	55,000
Silicomanganese		185,000	150,000	150,000	160,000	160,000
Other		9,000	9,000	9,000	9,000	9,000
Steel, crude	thousand metric tons	26,924 [4]	27,291 [4]	28,814 [4]	31,779 [4]	32,000
Semimanufactures[5]	do.	12,000	13,000	13,500	14,000	14,000
Lead:						
Mine output, Pb content		28,900 [4]	25,600 [4]	28,600 [4]	34,400 [r, 4]	39,800 [4]
Metal, refined:						
Primary		57,400 [4]	74,400 [4]	74,200 [r, 4]	77,500 [r, 4]	41,700 [4]
Secondary		20,500 [4]	22,000 [4]	35,000 [r, 4]	41,000 [r, 4]	25,000 [4]
Total		77,900 [4]	96,400 [4]	109,200 [r, 4]	118,500 [r, 4]	66,700 [4]
Manganese:						
Ore and concentrate, gross weight	thousand metric tons	1,550	1,600	1,700	1,650	1,700
Mn content	do.	590	600	630	620	630
Rare-earth metals, monazite concentrate, gross weight		5,000	5,000	5,000	5,000	5,000
Selenium	kilograms	11,500	11,500	11,500	12,000	12,000
Silver, mine and smelter output	do.	40,500 [r]	49,500 [4]	52,100 [4]	51,200 [r, 4]	13,300 [4]
Titanium concentrates, gross weight:						
Ilmenite		380,000	430,000	460,000	500,000	520,000
Rutile		17,000	19,000	18,000	18,000	19,000
Zinc:						
Mine output, concentrate:						
Gross weight		264,000	270,000	234,300 [4]	294,200 [4]	327,700 [4]
Zn content		144,000	146,000	129,000	162,000	184,000

See footnotes at end of table.

TABLE 1—Continued
INDIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity[3]		2000	2001	2002	2003	2004
METALS—Continued						
Zinc—Continued:						
Metal:						
Primary		176,000	207,000 [4]	231,400 [4]	253,900 [4]	238,400 [4]
Secondary		25,000	25,000	24,000	24,000	24,000
Total		201,000	232,000	255,000	278,000	262,000
Zirconium concentrate, zircon, gross weight		19,000	19,000	19,000	20,000	20,000
INDUSTRIAL MINERALS						
Abrasives, natural, n.e.s.:						
Corundum, natural	kilograms	1,250	1,200	1,200	1,150	1,100
Garnet		130,000	125,000	120,000	120,000	125,000
Jasper		7,500	8,000	8,000	8,500	8,500
Asbestos		21,000	21,000	18,000	19,000	18,000
Barite		840,000	850,000	916,000 [r]	675,000 [r]	723,000
Bromine, elemental		1,500	1,500	1,500	1,500	1,500
Cement, hydraulic	thousand metric tons	95,000	105,000 [r]	115,000 [r]	123,000 [r]	125,000
Chalk		110,000	110,000	110,000	115,000	115,000
Clays:						
Ball clay		375,000	370,000	400,000	390,000	400,000
Diaspore		13,000	13,000	12,000	12,000	11,000
Fireclay		345,000	350,000	355,000	360,000	365,000
Kaolin:						
Salable crude	thousand metric tons	530	540	540	550	550
Processed	do.	160	170	170	180	180
Total	do.	690	710	710	730	730
Other	do.	70	70	70	75	75
Diamond:						
Gem	thousand carats	16	17	17	16	16
Industrial	do.	41	43	45	44	43
Total	do.	57	60	62	60	59
Feldspar		110,000	110,000	110,000	150,000	150,000
Fluorspar:						
Concentrates, metallurgical-grade		3,782 [r, 4]	13,866 [r, 4]	6,296 [r, 4]	6,300 [r]	6,400
Other fluorspar materials, graded		3,253 [r, 4]	6,900 [r, 4]	4,188 [r, 4]	4,200 [r]	4,300
Gemstones, excluding diamond:						
Agate, including chalcedony pebble		250	250	200	200	200
Garnet	kilograms	850	900	700	800	850
Graphite[6]		140,000	140,000	130,000	110,000	120,000
Gypsum		2,210,000	2,250,000	2,300,000	2,300,000	2,350,000
Kyanite and related materials:						
Kyanite		5,000	5,500	6,000	6,000	6,200
Sillimanite		12,000	13,000	14,000	14,000	14,500
Lime		910,000 [r]	910,000 [r]	900,000 [r]	900,000 [r]	900,000
Magnesite		365,000	370,000	380,000	380,000	370,000
Mica:						
Crude		1,500	1,300	1,500	1,600	1,600
Scrap and waste		950	1,100	2,000	2,000	2,100
Total		2,450	2,400	3,500	3,600	3,700
Nitrogen, N content of ammonia	thousand metric tons	10,148 [4]	10,081 [4]	9,827 [4]	10,048 [r, 4]	10,718 [4]
Phosphate rock, including apatite		1,136,000 [4]	1,200,000	1,250,000	1,175,000 [r, 4]	1,180,000
Pigments, mineral, natural, ocher		336,000	355,000	360,000	365,000	360,000
Pyrites, gross weight		105,000	110,000	115,000	115,000	120,000

See footnotes at end of table.

TABLE 1—Continued
INDIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity[3]		2000	2001	2002	2003	2004
INDUSTRIAL MINERALS—Continued						
Salt:						
Rock salt	thousand metric tons	3	3	3	3	3
Other	do.	14,450 [4]	14,500	14,500	15,000	15,000
Total	do.	14,500	14,500	14,500	15,000	15,000
Sand:						
Calcareous	do.	240	245	250	250	255
Silica	do.	1,350	1,400	1,400	1,500	1,500
Other	do.	2,800	2,900	2,800	2,900	3,000
Slate		10,500	11,000	10,000	10,500	11,000
Soda ash		1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Stone, sand and gravel:						
Calcite		50,500	51,000	51,000	52,000	52,000
Dolomite	thousand metric tons	2,750	2,800	2,900	2,900	3,000
Limestone	do.	105,000	110,000	115,000	120,000	125,000
Quartz and quartzite	do.	260	270	250	250	260
Sulfur, byproduct from fertilizer plants		11,000	11,000	11,500	11,500	12,000
Talc and related materials:						
Pyrophyllite		85,000	86,000	85,000	86,000	86,000
Steatite, soapstone		545,000	546,000	550,000	552,000	550,000
Vermiculite		4,200	4,300	4,300	4,400	4,400
Wollastonite		100,000	100,000	105,000	120,000	115,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous	thousand metric tons	310,800 [4]	320,500 [4]	325,000	328,000	330,000
Liginte	do.	24,000	23,000	24,000	25,000	25,000
Total	do.	334,800 [4]	343,500 [4]	349,000	353,000	355,000
Gas, natural:						
Gross	million cubic meters	30,000	25,519 [4]	26,000	27,000	28,000
Marketable	do.	28,500	24,000	25,000	25,000	26,000
Petroleum:						
Crude	thousand 42-gallon barrels	238,068 [4]	239,292 [4]	240,000	241,000	244,000
Refinery products:						
Liquefied petroleum gas	do.	41,500	42,000	43,000	44,000	44,000
Gasoline	do.	40,500	41,000	42,000	42,000	43,000
Kerosene and jet fuel	do.	59,000	58,000	60,000	59,000	60,000
Distillate fuel oil	do.	169,000	170,000	172,000	171,000	172,000
Residual fuel oil	do.	68,000	67,000	69,000	70,000	71,000
Other	do.	91,500	92,000	94,000	93,000	93,000
Total	do.	470,000	470,000	480,000	479,000	483,000

[r]Revised.

[1]Table includes data available through August 4, 2005.

[2]Estimated data are rounded to no more than three significant digits; may not add to totals shown.

[3]In addition to commodities listed, other gemstones (aquamarine, emerald, ruby, and spinel) and uranium are produced, but output is not reported; available information is inadequate to make reliable estimates of output levels.

[4]Reported figure.

[5]Excludes production from steel miniplants.

[6]India's marketable production is 10% to 20% of mine production.

TABLE 2
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Alumina	Indian Aluminium Co. Ltd. [Indian interests, 60.4%, and Alcan Aluminium Ltd. (Canada), 39.6%]	Belgaum Refinery, Karnataka	280
Do.	National Aluminium Co. Ltd. (Indian Government, 100%)	Dhamanjodi Refinery, Orissa	1,580
Do.	Bharat Aluminium Co. Ltd. (Indian Government, 49%, and Sterlite Industries Ltd., 51%)	Korba Refinery, Chhattisgarh	200
Do.	Utkal Alumina International Ltd. [Norsk Hydro A/S (Norway), 45%; Alcan Aluminium Ltd. (Canada), 35%; Hindalco Industries Ltd., 20%]	Koraput Refinery, Orissa	1,000 [1]
Do.	Madras Aluminium Co. Ltd. [Alumix SpA (Italian Government), 27%; R. Prabhu and Associates, 24%; Tamil Nadu Industrial Investment Corp., 11%; others, 38%]	Mettur Refinery, Tamil Nadu	60
Do.	Indian Aluminium Co. Ltd. [Indian interests, 60.4%, and Alcan Aluminium Ltd. (Canada), 39.6%]	Muri Refinery, Jharkhand	88
Do.	Hindalco Aluminium Co. Ltd. (Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Renukoot Refinery, Uttar Pradesh	450
Aluminum	Indian Aluminium Co. Ltd. [Indian interests, 60.4%, and Alcan Aluminium Ltd. (Canada), 39.6%]	Alupuram Smelter, Kerala	20
Do.	National Aluminium Co. Ltd. (Indian Government, 100%)	Angul Smelter, Orissa	345
Do.	Indian Aluminium Co. Ltd. [Indian interests, 60.4%, and Alcan Aluminium Ltd. (Canada), 39.6%]	Belgaum Smelter, Karnataka	70
Do.	Do.	Hirakud Smelter, Orissa	30
Do.	Bharat Aluminium Co. Ltd. (Indian Government, 49%, and Sterlite Industries Ltd., 51%)	Korba Smelter, Chhattisgarh	100
Do.	Madras Aluminium Co. Ltd. [Alumix SpA (Italian Government), 27%; R. Prabhu and Associates, 24%; Tamil Nadu Industrial Investment Corp., 11%; others, 38%]	Mettur Smelter, Tamil Nadu	25
Do.	Hindalco Aluminium Co. Ltd. (Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Renukoot Smelter, Uttar Pradesh	275
Barite	Andhra Pradesh Mineral Development Corp. Ltd. (Andhra Pradesh State Government, 100%)	Cuddapah District mines, Andhra Pradesh	350
Do.	Associated Mineral Corp.	do.	75
Do.	Pragathi Minerals	do.	50
Do.	Shri C.M. Ram nath Reddy	do.	75
Do.	Vijaylaxmi Minerals Trading Co.	do.	50
Bauxite	Bharat Aluminium Co. Ltd. (Indian Government, 49%, and Sterlite Industries Ltd., 51%)	Amarkantak Mine, Madhya Pradesh	200
Do.	Indian Aluminium Co. Ltd. [Indian interests, 60.4%, and Alcan Aluminium Ltd. (Canada), 39.6%]	Kolhapur District mines, Maharashtra	600
Do.	Gujarat Mineral Development Corp. (Gujarat State Government, 100%)	Kutch and Saurashtra Mines, Gujarat	500
Do.	Hindalco Aluminium Co. Ltd. (Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Lohardarga District mines, Jharkland	750
Do.	Indian Aluminium Co. Ltd. [Indian interests, 60.4%, and Alcan Aluminium Ltd. (Canada), 39.6%]	do.	200
Do.	National Aluminium Co. Ltd. (Indian Government, 100%)	Panchpatmali Hills, Koraput District mines, Orissa	4,800
Do.	Minerals & Minerals Ltd. (Indian Government, 100%)	Richuguta, Palamau District mines, Jharkland	200
Borax	Borax Morarji Ltd.	Ambernath, Maharashtra	17
Cement	Larsen and Toubro Ltd.	Awarpur Plant, Maharashtra	2,300
Do.	Century Cement (Century Textiles and Industries Ltd., a subsidiary of the Birla Group, 100%)	Baikunth Plant, Madhya Pradesh	1,120

See footnotes at end of table.

TABLE 2—Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Cement—Continued:		Coromandel Fertilizers Ltd. [Chevron Chemical Co. (United States), 23.55%; International Minerals and Chemical Co., 20.89%; Parry and Co., 10.64%; E.I.D. Parry (India) Ltd., 6.65%; others, 38.27%]	Chilamkur Plant, Andhra Pradesh	1,000
Do.		The Associated Cement Cos. Ltd. (Indian Government, 34.86%, and private shareholders, 65.14%)	Gagal Plant, Himachal Pradesh	1,830
Do.		Raymond Cement Works (a division of Raymond Woolen Mills Ltd., JK Singhania, principal shareholder)	Gopalnagar Plant, Madhya Pradesh	1,250
Do.		Narmada Cement Co. Ltd. (Chowgule and Co. Ltd., 34%; Gujarat State Government, 17.33%; others, 48.67%)	Jafrabad Plant, Gujarat	1,000
Do.		Rajashree Cement (a division of Indian Rayon and Industries Ltd., 100%)	Khor Plant, Karnataka	1,020
Do.		The Associated Cement Cos. Ltd. (Indian Government, 34.86%, and private shareholders, 65.14%)	Kymore Plant, Madhya Pradesh	1,500
Do.		Mangalam Cement Ltd.	Morak Plant, Rajasthan	1,000
Do.		Mysore Cements Ltd. (Government institutions and banks, 41.13%; Corporate Trust Holdings, 21.70%; others, 37.17%)	Narasingarh Plant, Madhya Pradesh	1,089
Do.		Cement Corp. of India Ltd. (Indian Government, 100%)	Nayagaon Plant, Madhya Pradesh	1,330
Do.		JK Cement Works (a division of JK Synthetics Ltd., 100%)	Nimbahera Plant, Rajasthan	1,462
Do.		The India Cement Co. Ltd. (Indian Government, 26%; Life Insurance Corp. of India, 24%; others, 50%)	Sankarnagar Plant, Tamil Nadu	1,000
Do.		Maihar Cement (Century Textiles and Industries Ltd., a subsidiary of the Birla Group, 100%)	Satna Plant, Madhya Pradesh	1,800
Do.		Shree Digvijay Cement Co. Ltd.	Shreeniwas Plant, Maharashtra	1,060
Do.		Lakshmi Cement (a division of Straw Products Ltd., JK Singhania, principal shareholder)	Sirohi Plant, Rajasthan	1,400
Do.		Manikgarth Cement (Century Textiles and Industries Ltd., a subsidiary of the Birla Group, 100%)	Tehsil Rajura Plant, Maharashtra	1,000
Do.		Vasavadatta Cement (Kesoram Industries Ltd., 100%)	Vasavadatta Plant, Karnataka	1,000
Do.		Vikram Cement (Grasim Industries Ltd., a subsidiary of the Birla Group, 100%)	Vikram Plant, Madhya Pradesh	1,000
Do.		Raasi Cement Ltd. (Andhra Pradesh Government, 50%, and Development Co. Ltd., 50%)	Vishnupuram Plant, Andhra Pradesh	1,000
Do.		The Associated Cement Cos. Ltd. (Indian Government, 34.86%, and private shareholders, 65.14%)	Wadi Plant, Karnataka	2,180
Chromite		Ferro Alloys Corp. Ltd.	Cuttack District, Orissa	120
Do.		Orissa Mining Corp. Ltd. (Orissa Industries Ltd., 100%)	do.	300
Do.		Tata Iron and Steel Co. Ltd.	do.	100
Do.		Ferro Alloys Corp. Ltd.	Dhenkanal District, Orissa	75
Do.		Orissa Mining Corp. Ltd. (Orissa Industries Ltd., 100%)	do.	200
Do.		Mysore Minerals Ltd.	Hassan District, Karnataka	125
Do.		Ferro Alloys Corp. Ltd.	Kendujhar District, Orissa	75
Do.		Orissa Mining Corp. Ltd. (Orissa Industries Ltd., 100%)	do.	100
Do.		Ferro Alloys Corp. Ltd.	Khammam District, Andhra Pradesh	100
Coal, bituminous	million metric tons	Bharat Coking Coal Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Bihar and West Bengal	26
Do.	do.	Central Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Bihar	27
Do.	do.	Eastern Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Bihar and West Bengal	21
Do.	do.	Mahanadi Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Orissa	21
Do.	do.	North Eastern Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Assam	640

See footnotes at end of table.

TABLE 2—Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Coal, bituminous— Continued:	million metric tons	Northern Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Madhya Pradesh and Uttar Pradesh	24
Do.	do.	Singareni Collieries Co. Ltd. (Andhra Pradesh State Government, 50%, and Indian Government, 50%)	Andhra Pradesh	18
Do.	do.	South Eastern Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Madhya Pradesh	36
Do.	do.	Western Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Madhya Pradesh and Maharashtra	18
Coal, lignite	do.	Neyveli Lignite Corp. Ltd. (Indian Government, 100%)	Tamil Nadu	17
Copper, mine		Hindustan Copper Co. Ltd. (Indian Government, 100%)	Indian Copper Complex mines, Ghatsila District, Bihar	31
Do.		do.	Khetri Copper Complex mines, Khetrinagar Rajasthan	15
Do.		do.	Malanjkhand Copper Complex mines, Balaghar District, Madhya Pradesh	22
Copper, metal		Birla Copper	Birla Copper Complex smelter, Dahej, Gujarat	150
Do.		Hindustan Copper Co. Ltd. (Indian Government, 100%)	Indian Copper Complex smelter-refinery Ghatsila District, Bihar	20
Do.		do.	Khetri Copper Complex smelter-refinery Khetrinagar District, Rajasthan	45
Do.		Sterlite Industries Ltd.	Tuticorin Smelter, Tamil Nadu	180
Do.		do.	Silvassa Refinery, Gujarat	180
Diamond	carats	Indian Government	Mahjgawan Mine	25,000
Gold	kilograms	Hutti Gold Mines Co.	Hutti Mine, Karnataka	3,000
Ilmenite-rutile ore		Kerala Minerals and Metals Ltd. (Kerala State Government, 100%)	Chavara, Kerala	100
Do.		Indian Rare Earths Ltd. (Indian Government, 100%)	do.	200
Do.		do.	Ganjam, Orissa	220
Do.		do.	Manavalakurichi, Tamil Nadu	65
Do.		VV Minerals Ltd.	Kanyakumari, Tamil Nadu	130
Iron and steel:				
Crude steel		Visvesvaraya Iron and Steel Ltd. (Karnataka State, 60%, and Steel Authority of India Ltd., Indian Government, 40%)	Bhadravati steel plant, Karnataka	180
Do.		Steel Authority of India Ltd. (Indian Government, 100%)	Bhilai steel plant, Madhya Pradesh	4,930
Do.		do.	Bokaro steel plant, Bihar	4,000
Do.		Indian Iron and Steel Co. Ltd. (wholly owned subsidiary of Steel Authority of India Ltd., Indian Government, 100%)	Burnpur steel plant, West Bengal	1,500
Do.		Steel Authority of India Ltd. (Indian Government, 100%)	Durgapur steel plant, West Bengal	1,600
Do.		Tata Iron and Steel Co. Ltd.	Jamshedpur steel plant, Bihar	4,000
Do.		Steel Authority of India Ltd. (Indian Government, 100%)	Rourkela steel plant, Orissa	1,800
Do.		Rashtriya Ispat Nigam Ltd.	Visakhapatnam steel plant, Andhra Pradesh	3,200
Do.		Ministeel plants (privately owned)	About 180 plants located throughout India	4,700
Iron ore		National Mineral Development Corp. Ltd. (Indian Government, 100%)	Bailadila, Madhya Pradesh	9,000
Do.		Steel Authority of India Ltd. (Indian Government, 100%)	Bastar and Durg District, Madhya Pradesh	7,000
Do.		Kudremukh Iron Ore Co. Ltd. (Indian Government, 100%)	Kudremukh, Chikmagalur District, Karnataka	10,300
Do.		National Mineral Development Corp. Ltd. (Indian Government, 100%)	Donimalai, Karnataka	9,000
Do.		Chowgule and Co. Ltd.	Goa	2,500

See footnotes at end of table.

TABLE 2—Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Iron ore—Continued:	Dempo Mining Corp. Ltd.	Goa	2,500
Do.	V.M. Salgaocar & Bros. Pvt. Ltd.	do.	2,500
Do.	Sesa Goa Ltd.	Codli and Sonshi, Goa	NA
Do.	Steel Authority of India Ltd. (Indian Government, 100%)	Kendujhar District, Orissa	3,000
Do.	Tata Iron and Steel Co. Ltd.	do.	2,000
Do.	Indian Iron and Steel Co. Ltd. (wholly owned subsidiary of Steel Authority of India Ltd., Indian Government, 100%)	Singhbhum District, Bihar	2,500
Do.	Steel Authority of India Ltd. (Indian Government, 100%)	do.	3,500
Do.	Tata Iron and Steel Co. Ltd.	do.	3,500
Kyanite	Associated Mining Co.	Bhandara District, Maharashtra	10
Do.	Maharashtra Mineral Corp. Ltd.	do.	10
Do.	Bihar State Mineral Development Corp. Ltd. (Bihar State Government, 100%)	Singhbhum District, Bihar	10
Do.	Hindustan Copper Co. Ltd. (Indian Government, 100%)	do.	22
Lead ore	Hindustan Zinc Ltd. (Indian Government, 100%)	Agnigundala Mine, Andhra Pradesh	72
Do.	do.	Sargipalli Mine, Orissa	150
Lead:			
Primary	Hindustan Zinc Ltd. (Indian Government, 100%)	Chanderiya Smelter, Rajasthan	35
Do.	do.	Tundoo Smelter, Bihar	8
Secondary	Indian Lead Co.	Thane Refinery, Mumbai, Maharashtra	25
Do.	do.	Wada, Mumbai, Maharashtra	40
Lead-zinc ore	do.	Rampura-Agucha Mine, Rajasthan	1,300
Do.	do.	Zawar mine group, Rajasthan	1,200
Magnesite	Burn Standard Co. Ltd. (Indian Government, 100%)	Salem, Tamil Nadu	150
Do.	Dalmia Magnesite Corp.	do.	150
Do.	Tamil Nadu Magnesite Ltd. (Tamil Nadu State Government, 100%)	do.	150
Manganese ore[2]	Manganese Ore India Ltd. (Indian Government, 100%)	Adilabad, Andhra Pradesh	NA
Do.	Falechand Marsingdas	Andhra Pradesh	NA
Do.	Manganese Ore India Ltd. (Indian Government, 100%)	Balaghat, Madhya Pradesh	NA
Do.	J.A. Trivedi Bros.	do.	NA
Do.	Sandur Manganese and Iron Ores Ltd.	Bellary, Karnataka	NA
Do.	Manganese Ore India Ltd. (Indian Government, 100%)	Bhandara, Maharashtra	NA
Do.	Eastern Mining Co.	North Kanara, Karnataka	NA
Do.	Mysore Minerals Ltd.	do.	NA
Do.	Manganese Ore India Ltd. (Indian Government, 100%)	Keonjhar, Orissa	NA
Do.	Mangilah, Rungta (Pvt.) Ltd.	do.	NA
Do.	Orissa Mining Corp. Ltd.	do.	NA
Do.	Rungta Mines (Pvt.) Ltd.	do.	NA
Do.	Serajuddin & Co.	do.	NA
Do.	S. Lall & Co.	do.	NA
Do.	Tata Iron and Steel Co. Ltd.	do.	NA
Do.	Orissa Mineral Development Co. Ltd.	Koraput, Orissa	NA
Do.	Orissa Mining Corp. Ltd.	do.	NA
Do.	Mysore Minerals Ltd.	Shimoga, Karnataka	NA
Do.	Aryan Mining & Trading Corp.	Sundargarh, Orissa	NA
Do.	Orissa Manganese & Minerals (Pvt.) Ltd.	do.	NA
Do.	Tata Iron and Steel Co. Ltd.	do.	NA
Do.	R.B.S. Shreeram Durga Prasad and Falechand Marsingdas	Vizianagaram, Andhra Pradesh	NA
Petroleum, refined products thousand 42-gallon barrels per day	Cochin Refineries Ltd. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 55%, and private interests, 45%)	Ambalamugal Refinery, Kerala	93,000
Do. do.	Indian Oil Corp. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 91%, and private interests, 9%)	Barauni Refinery, Bihar	66,000

See footnotes at end of table.

TABLE 2—Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Petroleum, refined products—Continued:	thousand 42-gallon barrels per day	Bongaigaon Refinery and Petrochemicals Ltd. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 100%)	Bongaigaon Refinery, Assam	27,000
Do.	do.	Indian Oil Corp. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 91%, and private interests, 9%)	Digboi Refinery, Assam	12,000
Do.	do.	do.	Guwahati Refinery, Assam	20,000
Do.	do.	do.	Haldai Refinery, West Bengal	61,000
Do.	do.	do.	Koyali Refinery, Gujarat	185,000
Do.	do.	Madras Refineries Ltd. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 52%, and private interests, 48%)	Madras Refinery, Tamil Nadu	131,000
Do.	do.	Bharat Petroleum Corp. Ltd. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 67%, and private interests, 33%)	Mahul Refinery, Mumbai, Maharashtra	135,000
Do.	do.	Industan Petroleum Corp. Ltd. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 51%, and private interests, 49%)	do.	110,000
Do.	do.	do.	Visakhapatnam Refinery, Andhra Pradesh	90,000
Do.	do.	Indian Oil Corp. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 91%, and private interests, 9%)	Mathura Refinery, Uttar Pradesh	156,000
Do.	do.	do.	Panipat Refinery, Haryana	120,000
Phosphate rock[3]		Rajasthan State Mineral Development Corp. Ltd. (Rajasthan State Government, 100%)	Badgaon, Dakankotra, Kanpur, Kharbaria-ka-Guda, and Sallopat Mines, Rajasthan	NA
Do.		Pyrites Phosphates and Chemicals Ltd.	Durmala and Maldeota underground mines, Uttar Pradesh	NA
Do.		Madhya Pradesh State Mining Corp. Ltd. (Pradesh State Government, 100%)	Hirapur and Khatamba Mines, Madhya Pradesh	NA
Do.		Rajasthan State Mines and Minerals Ltd. (Rajasthan State Government, 100%)	Jhamarkotra Mine, Rajasthan	NA
Do.		Hindustan Zinc Ltd. (Indian Government, 100%)	Maton Mine, Rajasthan	NA
Zinc		Binani Zinc Ltd.	Binanipuram Smelter, Kerala	38
Do.		Hindustan Zinc Ltd. (Indian Government, 100%)	Chanderiya Smelter, Rajasthan	100
Do.		do.	Debari Smelter, Rajasthan	78
Do.		do.	Visakhapatnam (Vizag) Smelter, Andhra Pradesh	54

[e]Estimated. NA Not available.
[1]Scheduled for startup in 2005.
[2]Capacity of clusters of surface mines varies extremely, depending on demand. Estimated total capacity is 1.5 million metric tons per year.
[3]Estimated total phosphate rock capacity is 800,000 metric tons per year.